

WE CLAIM:

1 A method for filling spaces between patterned metal features, the method comprising the steps of:

- 5 coating the patterned metal features with a first material so as to partially fill the space between the metal features; and  
treating the first material at a temperature less than a melting point of the metal features  
10 so as to cause the first material to expand.

2. The method of claim 1 wherein the coating step comprises CVD process.

3. The method of claim 1 wherein the coating step comprises deposition of amorphous silicon.

4. The method of claim 1 further comprising depositing an insulating barrier layer on the patterned metal features before the step of coating.

5. The method of claim 4 further comprising the step of facet etching the insulating barrier layer before the step of coating.

6. The method of claim 1 wherein the step of treating comprises plasma oxidation.

7. The method of claim 1 wherein the step of treating comprises plasma nitridization.

8. A method for manufacturing a semiconductor device comprising the steps of:  
providing a semiconductor substrate;  
forming patterned features protruding from a  
5 surface of the substrate, wherein recessed areas exist between the protruding features;  
forming a material capable of expansion upon further reaction on the protruding features;  
reacting the material capable of expansion  
10 to cause it to expand so as to contour the protruding features.

9. The method of claim 8 wherein the protruding features are gate electrodes, the material capable of expansion comprises silicon, and the step of forming comprises blanket  
5 deposition followed by an etch leaving silicon stringers on the protruding features.

10. The method of claim 9 wherein the step of reacting comprises plasma oxidation.

11. The method of claim 9 wherein the step of reacting comprises plasma nitridization.

00000000000000000000000000000000

*Ad B1*